

Holdsworth Land Pty Ltd

14-16 Marshall Avenue, 5-9 Holdsworth Avenue &  
2-10 Berry Road, St Leonards

## Acoustic DA Assessment

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**Table of Contents**

1	Introduction .....	3
2	Noise Criteria .....	4
2.1	Internal Noise Levels .....	4
2.2	Sound Insulation Requirement (Part F5 NCC/BCA) .....	5
2.3	Noise Survey and Project Specific Limits.....	7
2.3.1	Traffic Noise Results.....	7
2.3.2	EPA Noise Policy for Industry .....	8
3	Assessment and Recommendations.....	9
3.1	Façade Glazing Requirements .....	9
3.2	Building Façade Construction .....	9
3.3	Mechanical Services .....	10
4	Conclusion .....	11
	Appendix A – Acoustic Terminology.....	12
	Appendix B – Architectural Drawings.....	13
	Appendix C – Noise Logger Results .....	14

**Index of Figures**

Figure 1 – Site Location, Nearest Residents and Noise Logger Position .....	3
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**Index of Tables**

Table 1— Recommended Internal Design Noise Levels (AS/NZS 2107) .....	4
Table 2 - NCC Part F5 Requirements (Class 2 or 3).....	5
Table 3 – Measured Ambient and Traffic Noise Levels, dBA .....	7
Table 4—Noise Survey Summary and DCP Project Limits, dBA .....	8
Table 5 – Schedule of Window and Glazing ( $R_w$ ).....	9
Table 6 – External Façade Construction ( $R_w$ ).....	9

## 1 Introduction

The following report has been prepared by Acouras Consultancy on behalf of Holdsworth Land Pty Ltd to assess the potential for noise impact associated with the 14-16 Marshall Avenue, 5-9 Holdsworth Avenue & 2-10 Berry Road, St Leonards. The residential development will include:

- Carpark on ground to level 2 and two (2) levels of basement.
- Three (3) residential buildings with apartments on ground to level 12.

The proposed residential development is surrounded by existing residential buildings. The site location is shown in Figure 1.



**Figure 1 – Site Location, Nearest Residents and Noise Logger Position**

## 2 Noise Criteria

The following standards and guidelines are applicable to this project:

- Lane Cove Council DCP Part B.7 and Part C.2-Residential Developments.
- NCC/BCA Part F5.
- NSW EPA “Noise Policy for Industry” (NPfI).
- Australian standard AS/NZS 2107-2016: Acoustics – Recommended design sound levels and reverberation times for building interiors.
- Australian standard AS 1055.1-1997: Acoustics – Description and measurement of environmental noise - General procedures.

### 2.1 Internal Noise Levels

For the residential development, the Lane Cove Council DCP Part C-Residential Developments recommends the following internal design noise levels for apartments:

*Internal habitable rooms of dwellings affected by high levels of external noise are to be designed to achieve internal noise levels of no greater than 50dBA.*

The Australian Standard AS 3671-1989 ‘Acoustics - Road traffic noise intrusion -building siting and construction’ provides guidance on the design but is limited as it refers to the Australian Standard AS 2107. Australian Standard AS 2107 – 2016 ‘Acoustic – Recommended Design Sound Levels and Reverberation Times for Building Interiors’ to provide the recommended design sound levels for different areas of occupancy in buildings. Table 1 presents the recommended internal design noise levels in accordance with AS 2107 – 2016.

**Table 1— Recommended Internal Design Noise Levels (AS/NZS 2107)**

Type of occupancy/activity	Design sound level (L <sub>Aeq,t</sub> ) range
Houses and apartments in suburban areas or near minor roads—	
Apartment common areas, corridors, lobbies (e.g. foyer, lift lobby)	45 to 50
Living areas	30 to 40
Sleeping areas (night time)	30 to 35
Work areas	35 to 40
Enclosed Carparks	< 65

## 2.2 Sound Insulation Requirement (Part F5 NCC/BCA)

For sound transmission and insulation between sole occupancy units (SOU) within the same development, walls and floors to be constructed in accordance with requirements of Part F5 of the Building Code of Australia (BCA). Sound insulation requirements are summarised in Table 2.

**Table 2 - NCC Part F5 Requirements (Class 2 or 3)**

Building Element	Minimum NCC Part F5 Requirements
<b>Sound Insulation Rating of Walls (Class 2 or 3)</b>	
Walls between separate sole occupancy units.	Rw + Ctr 50 (airborne)
Walls between wet areas (bathrooms, sanitary compartment, laundry or kitchen) and a habitable room (other than kitchen) in adjoining apartments.	Rw + Ctr 50 (airborne) & of discontinuous construction
Walls between sole occupancy unit and stairway, public corridors, public lobby or the like or parts of a different classification.	Rw 50 (airborne)
Walls between a plant room or lift shaft and a sole occupancy unit.	Rw 50 (airborne) & of discontinuous construction
<b>Sound Insulation Rating of Floors (Class 2 or 3)</b>	
Floors between sole occupancy units or between a sole occupancy unit and plant room, lift shaft, stairway, public corridor, public lobby or the like.	Rw + Ctr 50 (airborne) & Ln,w + CI < 62 (impact)
<b>Apartment Entry Doors (Class 2 or 3)</b>	
A door incorporated in a wall that separates a sole-occupancy unit from a stairway, public corridor, public lobby or the like.	Rw 30 (airborne)
<b>Services (Class 2, 3 or 9c)</b>	
If a storm water pipe, a duct, soil, waste or water supply pipe including a duct or pipe that is located in a wall or floor cavity serves or passes through more than one sole occupancy unit must be separated:	
if the adjacent room is a habitable room (other than a kitchen); or	Rw + Ctr 40
if the room is a kitchen or non-habitable room	Rw + Ctr 25



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**Construction Deemed to Satisfy**

The forms of construction must be installed as follows:

- (a) Masonry—Units must be laid with all joints filled solid, including those between the masonry and any adjoining construction.
- (b) Concrete slabs—Joints between concrete slabs or panels and any adjoining construction must be filled solid.
- (c) Sheeting materials—
  - (i) if one layer is required on both sides of a wall, it must be fastened to the studs with joints staggered on opposite sides; and
  - (ii) if two layers are required, the second layer must be fastened over the first layer so that the joints do not coincide with those of the first layer; and
  - (iii) joints between sheets or between sheets and any adjoining construction must be taped and filled solid.
- (d) Timber or steel-framed construction—perimeter framing members must be securely fixed to the adjoining structure and—
  - (i) bedded in resilient compound; or
  - (ii) the joints must be caulked so that there are no voids between the framing members and the adjoining structure.
- (e) Services—
  - (i) Services must not be chased into concrete or masonry elements.
  - (ii) A door or panel required to have a certain  $R_w + C_{tr}$  that provides access to a duct, pipe or other service must—
    - (A) not open into any habitable room (other than a kitchen); and
    - (B) be firmly fixed so as to overlap the frame or rebate of the frame by not less than 10 mm, be fitted with a sealing gasket along all edges and be constructed of—
      - (aa) wood, particleboard or blockboard not less than 33 mm thick; or
      - (bb) compressed fibre reinforced cement sheeting not less than 9 mm thick; or
      - (cc) other suitable material with a mass per unit area not less than 24.4 kg/m<sup>2</sup>
  - (iii) A water supply pipe must—
    - (A) only be installed in the cavity of discontinuous construction; and
    - (B) in the case of a pipe that serves only one sole-occupancy unit, not be fixed to the wall leaf on the side adjoining any other sole-occupancy unit and have a clearance not less than 10 mm to the other wall leaf.
  - (iv) Electrical outlets must be offset from each other—
    - (A) in masonry walling, not less than 100 mm; and
    - (B) in timber or steel framed walling, not less than 300 mm.

## 2.3 Noise Survey and Project Specific Limits

An unattended noise survey was carried out at the site to measure the background and ambient noise levels. Noise monitoring was conducted between Thursday 24<sup>th</sup> to Wednesday 30<sup>th</sup> June 2021. The noise measurements position are shown in Figure 1:

- Location 1 (L1) – Unattended noise monitor at rear of No.8 Berry Road.
- Location 2 (L2) – Traffic noise measurement at front of No.8 Berry Road.
- Location 3 (L3) – Traffic noise measurement on the corner of Marshal Ave and Berry Road.
- Location 4 (L4) – Traffic noise measurement at front of No.8 Berry Road.

Measurements were conducted using the following equipment:

- SVAN 977 Type 1 Real time Analyser/Noise Logger. Serial No. 34892.
- SVAN 977C Type 1 Real time Analyser/Noise Logger. Serial No. 97497.
- SVAN SV30A Type 1 Sound Level Calibrator. Serial No. 31830.

Noise monitoring was conducted in general accordance with Australian standard AS 1055.1-1997: Acoustics-Description and measurement of environmental noise-General procedures.

The noise analyser was calibrated immediately before and after measurements were taken with no discernible differences between these two recorded levels. The sound analyser is Type 1 and complies with Australian standard AS1259.2: 1990.

During the monitoring period any adverse weather condition have been excluded. The noise logger results are presented in Appendix C.

### 2.3.1 Traffic Noise Results

Table 3 presents a summary of the measured morning peak traffic noise level impacting the proposed development.

**Table 3 – Measured Ambient and Traffic Noise Levels, dBA**

Location	Period	Average $L_{eq}(15min)$
L2: Berry Road	AM Peak (08:15-09:00)	53
L3: Crn Marshal Ave and Berry Rd	AM Peak (08:15-08:45)	63
L4: Holdsworth Ave	AM Peak (08:45-09:00)	57

### 2.3.2 EPA Noise Policy for Industry

To control mechanical noise emissions, the Lane Cove Council DCP Part C.1 Section 1.8 requires:

*The noise generated by mechanical equipment of any sort must not exceed the background noise level by more than 5dB (A) when measured in or on the lot adjacent to the equipment. Where sound levels are exceeded, sound proofing measures will be required.*

Table 4 presents a summary of the measured background noise level and the allowable intrusive noise limit for this project in accordance with the Lane Cove Council DCP. For the purpose of the assessment, the background noise level has been determined using the RBL in accordance with the method given in the EPA guidelines.

**Table 4—Noise Survey Summary and DCP Project Limits, dBA**

Time Period	Existing Noise Levels		DCP Noise Limits, Leq
	Leq (period)	RBL	
Day	51	45	50
Evening	59	41	46
Night	48	35	40

During detailed design stage, the design and selection of the mechanical equipment required to service the proposed development will be required to achieve the Lane Cove Council DCP noise limits as presented in the table above.



### 3 Assessment and Recommendations

#### 3.1 Façade Glazing Requirements

Acoustic glazing for the apartments are given in Table 5 are required to reduce noise impact on the internal occupants and should result in noise levels within such units in accordance with the Lane Cove Council DCP and Australian Standards (AS/NZS 2107).

**Table 5 – Schedule of Window and Glazing ( $R_w$ )**

Building	Apartment	Space	Glazing Thickness	Minimum $R_w$ (Glazing+Frame)
All	All	Living & Bedrooms	6.38mm laminated	30

All other non-habitable spaces, such as bathrooms and laundries require minimum 6mm monolithic glass ( $R_w$  28).

All Windows/doors should be well sealed (air tight) when closed with good acoustic seals around the top and bottom sliders. Mohair seals are not considered to be acoustic seals.

#### 3.2 Building Façade Construction

To provide sufficient acoustic attention of noise, the general external construction of the proposed building would need to be constructed as detailed in Table 6.

**Table 6 – External Façade Construction ( $R_w$ )**

Building Element	Proposed Construction	Minimum $R_w$
External Wall	External brick veneer cavity system, Hebel façade system or similar. Insulation as per thermal requirements.	45
Roof and ceiling	Concrete with a plasterboard cavity ceiling. Insulation as per thermal requirements.	45

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### 3.3 Mechanical Services

At this stage, the design and selection of mechanical equipment has not been selected or finalised. Typically, based on the current documentation, list of equipment and similar sized residential projects we would expect the following noise control measures to be implemented:

- Carpark exhaust/supply fans located in the basement or rooftop plantroom.
  - Exhaust and supply fans operate with a VSD and CO sensor.
  - The fans operate on variable speed and are unlikely to operate at full speed during the night period of between 10pm and 7am.
  - Provide acoustic attenuators to the supply and discharge of the fans.
- Apartment exhaust fans (toilet, laundry, kitchen):
  - Electrically inter-locked with the light switch or have manual switch for the room served.
  - Internally lined ducts and acoustic flex ducts to be fitted to the fans.
  - These units would be inaudible at the boundary and at the nearest affected receivers.
- Outdoor A/C condenser would be located on the balcony of each apartment. The noise level of a typical A/C condenser is approximately SPL 52-56dBA at 1m, the predicted noise level at the boundary would be 30-35dBA.
- Vibration isolation mounts are to be selected in accordance with manufacturer's recommendations. Where required, incorporate restraining devices to prevent excessive movement of plant, equipment and piping systems.

During the Construction Certification stage review, a detail assessment of all mechanical plant and equipment will be conducted to ensure compliance with the DCP noise criteria.

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## 4 Conclusion

An acoustic assessment of the proposed development has been carried out in accordance with the requirements of Lane Cove Council DCP Part B and C, and the Australian Standards.

An environmental noise survey of the site has been conducted and the noise limiting criteria for mechanical plant/equipment noise emission has been determined based on the EPA NPfl. The limits are presented in Table 4. Once all equipment has been selected, a detailed review of the proposed mechanical plant and equipment would be conducted to ensure compliance with the DCP noise limits.

Construction for glazing, external walls and the roof/ceiling systems have been provided to achieve the internal noise criteria and are detailed in Section 3.1 and Section 3.2 based on the impact of road traffic noise. The acoustic glazing for the apartments are given in Table 5 to comply with internal noise criteria as recommended by the Australian Standards (AS/NZS 2107).

Providing the recommendations in this report are implemented, the noise from the proposed development is predicted to comply with acoustic requirements of the Lane Cove Council DCP, BCA Part F5 and relevant Australian standards.

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## Appendix A – Acoustic Terminology

**Decibel, dB:** A dimensionless unit which denotes the ratio between two quantities that are proportional to power, energy or intensity. One of these quantities is a designated reference by which all other quantities of identical units are divided. The sound pressure level in decibels is equal to 10 times the logarithm (to the base 10) of the ratio between the pressure squared divided by the reference pressure squared. The reference pressure used in acoustics is 20 micro Pascals.

**A-WEIGHTING:** A measure of sound pressure level designed to reflect the response of the human ear, which does not respond equally to all frequencies. To describe sound in a manner representative of the human ear's response it is necessary to reduce the effects of the low and high frequencies with respect to medium frequencies. The resultant sound level is said to be A-weighted, and the units are in decibels (dBA). The A-weighted sound level is also called the noise level.

**Sound Pressure Level,  $L_p$  (dB), of a sound:** 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure to the reference sound pressure of 20 micro Pascals. Sound pressure level is measured using a microphone and a sound level meter, and varies with distance from the source and the environment.

**Ambient Noise/Sound:** All noise level present in a given environment, usually being a composite of sounds from many sources far and near. Traffic, HVAC, masking sound or even low-level background music can contribute to ambient level of noise or sound.

**Percentile Level -  $L_{90}$ ,  $L_{10}$ , etc:** A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, e.g.  $L_{90}$  is the level which is exceeded for 90% of a measurement period.  $L_{90}$  is commonly referred to as the "background" sound level.

**Background Noise ( $L_{90}$ ):** The sum total of all unwanted residual noise generated from all direct and reflected sound sources in a space that can represent an interface to, or interfere with good listening and speech intelligibility.

**Rating Background Level – RBL:** Method for determining the existing background noise level which involves calculating the tenth percentile from the  $L_{A90}$  measurements. This value gives the Assessment Background Noise Level (ABL). Rating Background Level is the median of the overall ABL.

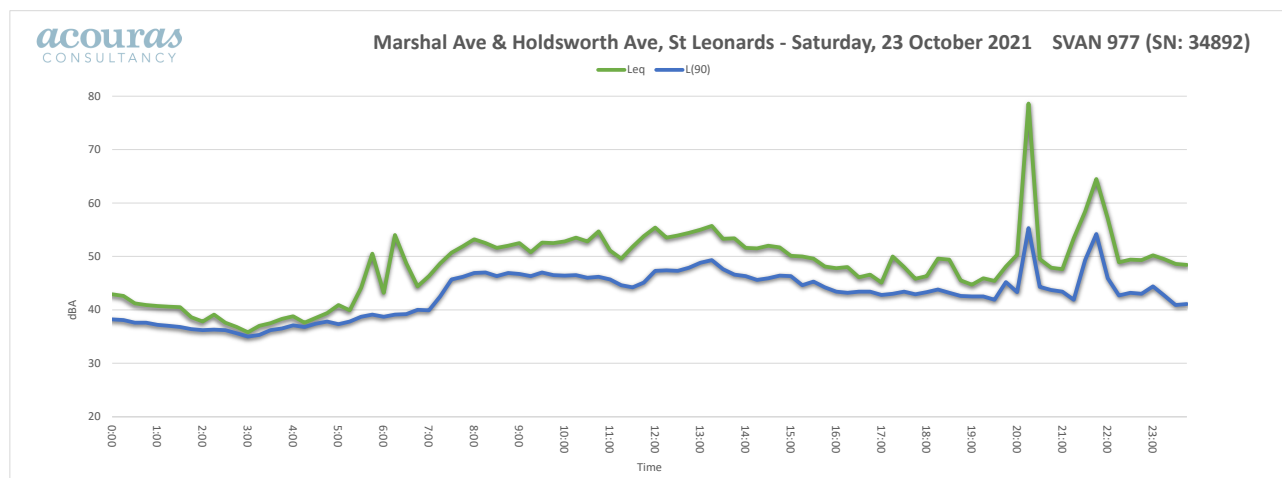
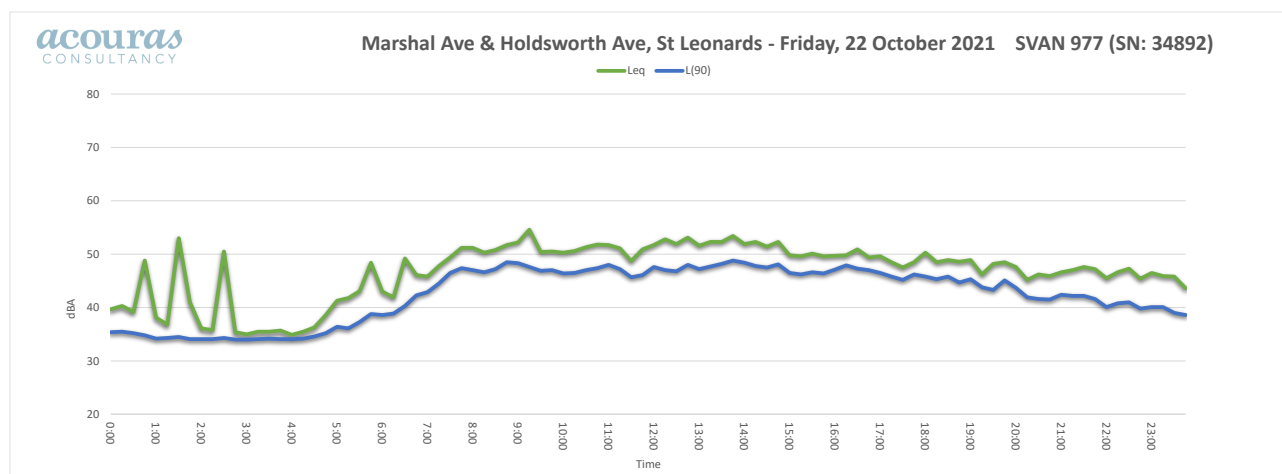
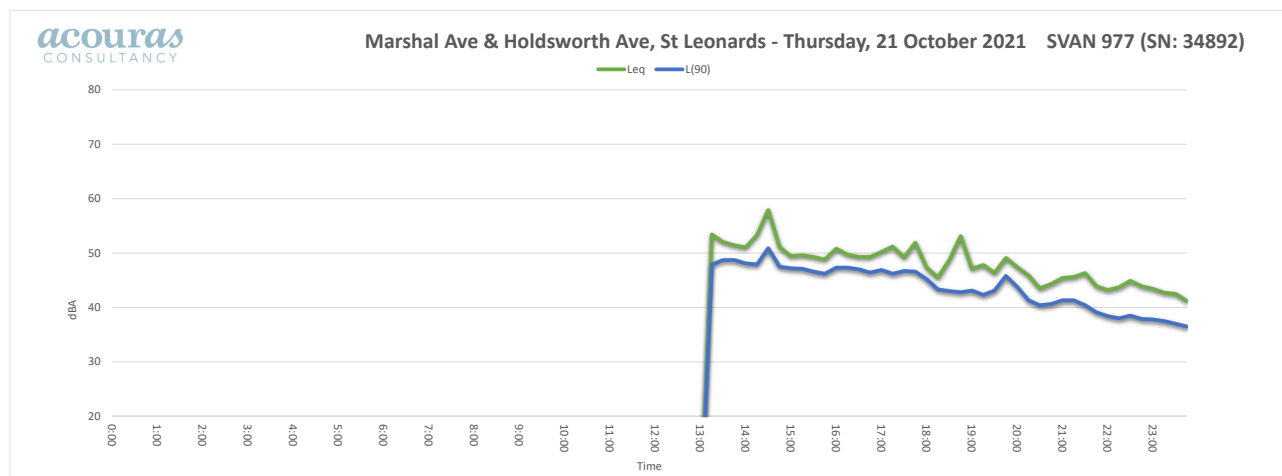
**$L_{AEQ,T}$ :** Equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

## Appendix B – Architectural Drawings

This assessment was based on the following architectural drawings provided by PTW.

Drawing	Issue	Date	Description
DA-A110010	B	24/03/2023	Cover Sheet & Drawing List
DA-B1B0910	G	24/03/2023	Basement 02 Plan
DA-B1B1010	G	24/03/2023	Basement 01 Plan
DA-B1GRD10	H	24/03/2023	Ground Floor Plan
DA-B1L0110	H	24/03/2023	Level 01 Plan
DA-B1L0210	H	24/03/2023	Level 02 Plan
DA-B1L0310	G	24/03/2023	Level 03 Plan
DA-B1L0410	F	24/03/2023	Level 04 Plan
DA-B1L0510	F	24/03/2023	Level 05 Plan
DA-B1L0610	F	24/03/2023	Level 06 Plan
DA-B1L0710	F	24/03/2023	Level 07 Plan
DA-B1L0810	F	24/03/2023	Level 08 Plan
DA-B1L0910	F	24/03/2023	Level 09 Plan
DA-B1L1010	F	24/03/2023	Level 10 Plan
DA-B1L1110	F	24/03/2023	Level 11 Plan
DA-B1L1210	F	24/03/2023	Level 12 Plan
DA-B1L1410	B	24/03/2023	Roof Plan
DA-C010010	B	24/03/2023	East Elevation
DA-C020010	B	24/03/2023	South Elevation
DA-C030010	B	24/03/2023	West Elevation
DA-C040010	B	24/03/2023	North Elevation

## Appendix C – Noise Logger Results

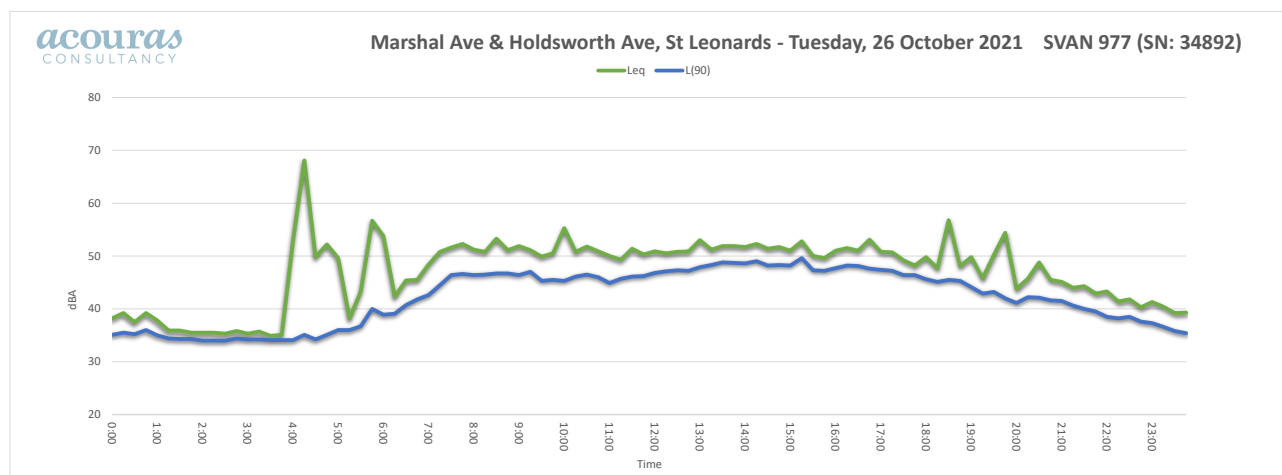
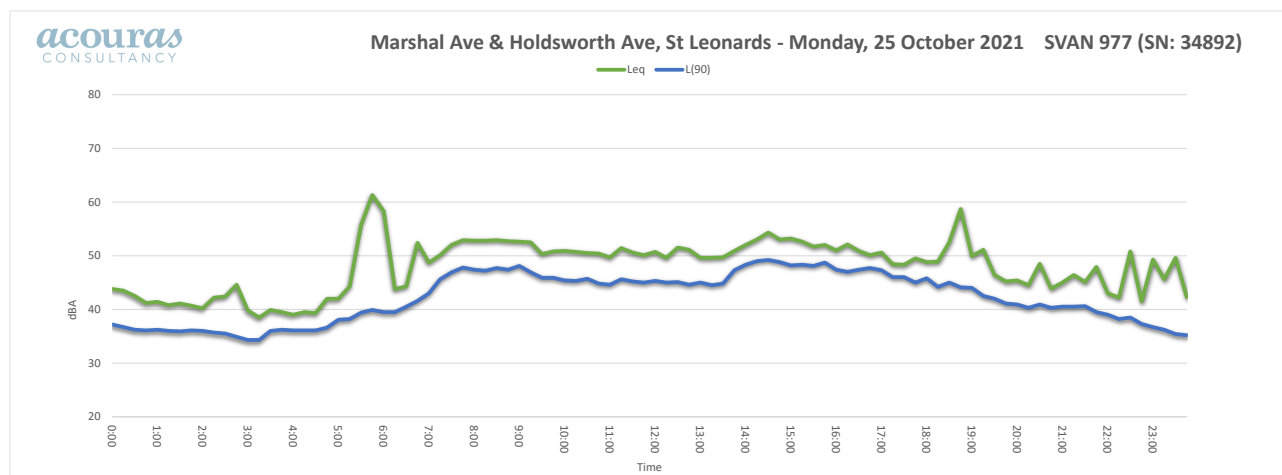
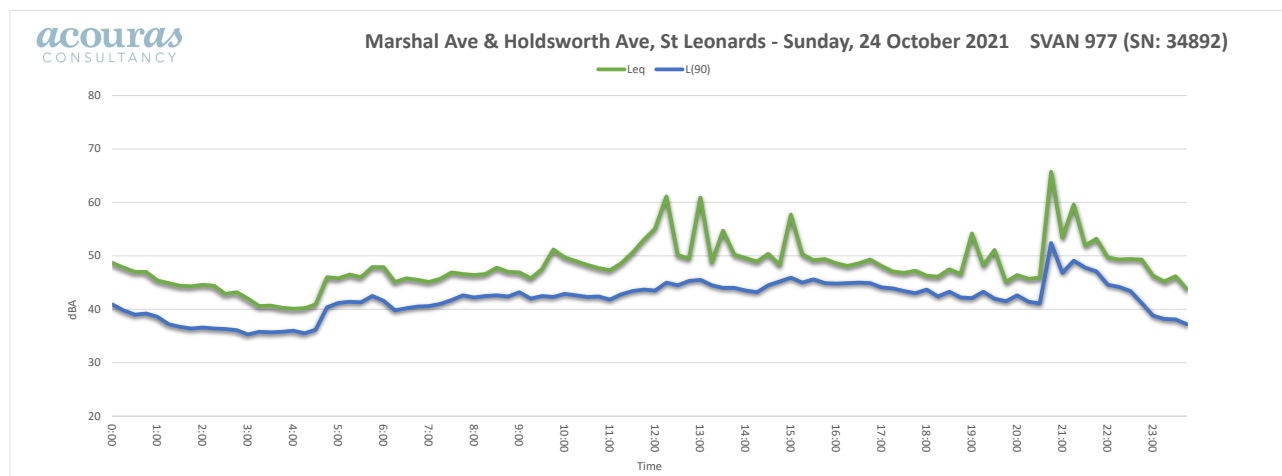




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